CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER No. 89-080

SITE CLEANUP REQUIREMENTS FOR:

ADVANCED MICRO DEVICES
915 DEGUIGNE DRIVE
SUNNYVALE
SANTA CLARA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board) finds that:

1. Location and Facility Description - Advanced Micro Devices (AMD) owns and operates a semiconductor manufacturing facility at 915 DeGuigne Drive, Sunnyvale, Santa Clara County (AMD 915). The AMD 915 site is in a broad area bounded by the Bayshore, Central, and Lawrence Expressways and Fair Oaks. The facility is located in an industrial park setting bordered by residential areas.

   This is an area of northern Santa Clara County with topography that is flat; local surface water drainage is to the north toward San Francisco Bay. Vegetation in the area is grass, and landscaped shrubs and trees, with much of the surface area given over to paved parking areas.

2. Regulatory Status AMD is hereinafter referred to as a discharger because of the releases of hazardous wastes that have occurred at its site. AMD is also a Responsible Party under Federal Superfund regulations (CERCLA/SARA), and is proposed for inclusion on the National Priorities List (NPL). This Order is intended to outline the tasks required for completion of the Remedial Investigation/Feasibility Study (RI/FS) as required by CERCLA/SARA. These tasks are further defined in the RI/FS workplan, which was originally submitted by AMD January 10, 1989. The workplan is in the final stages of revision and it is the intent of this Order to approve the tasks identified by the workplan for the completion of the RI/FS.

3. Site History - Advanced Micro Devices Building 915 (AMD 915) was built in 1974, and was the first commercial construction at this site. This facility was designed and has been used as a semiconductor manufacturing facility from 1974 through the present. The manufacturing processes at this site have involved the use of solvents, caustics, and acids.

Initial investigation at this site began voluntarily in 1982. One point source for soil and groundwater pollution at AMD 915 was located in 1981 when the acid neutralization system was removed from service. Based on tank integrity tests only one of the three tanks included in the acid neutralization system is known to have leaked. This is the only point source of pollution that has been identified as specific to AMD 915.

Groundwater investigation also began in 1982. Ongoing extraction of groundwater through existing building dewatering sumps was supplemented in 1982 with the addition of the first in a series of groundwater extraction wells. Monitoring of groundwater quality has been ongoing, at least quarterly , since 1982.

Following the initial phase of investigation and the beginning of groundwater extraction Waste Discharge Requirements were established for this site in February 1985. NPDES Permit Number CA0028797 was issued at that time and is still in effect.

4. Hydrogeology Stratigraphy in the area surrounding the AMD 915 site is characterized by interbedded and interfingering sands, silts and clays. These soils were deposited in complex patterns as part of fluvial systems draining the uplands to the south and deposited as the streams flowed north toward the Bay.

The groundwater gradient in all identified aquifers, in static conditions, is to the north toward San Francisco Bay. Local reversal of gradient in the B aquifers is observed in the vicinity of groundwater extraction systems.

Three local aquifers have been identified through the investigation at AMD 915. The shallowest of these aquifers has been designated the A aquifer and extends from 7 to 20 feet below the ground surface. The permeable portion of this unit is generally from three to five feet thick. The next shallowest unit has been designated as the B1 aquifer which is separated from the A aquifer by a relatively impermeable zone of silty clays. The B1 generally occurs from 20 to 35 feet below the ground surface and appears to be lenticular and discontinuous in nature with highly variable thickness. The next unit has been designated as the B2 aquifer and is separated from the B1 aquifer by 12 to 35 feet of silty clay and clayey silt. Depth to the B2 aquifer at AMD 915 is highly variable ranging from 38 to 65 feet. Permeable units in the B2 range from 2.9 to 12 feet in thickness with an average thickness of 5 feet.

5. Chemicals Of Concern Chemicals detected in water and soil include trichloroethylene (TCE), trichlorobenzene (TCB) and Freon 113. In addition, trans 1,2-dichloroethylene, trichlorethane, and tetrachloroethylene have been detected in the groundwater. TCE is the chemical most commonly present in soil and groundwater and serves as an indicator chemical for this site and the upgradient AMD, TRW, and Signetics sites. However, at AMD 915, TCB has been detected in soil and water at concentrations higher than any concentrations of TCE.

6. Soil Pollution Soil pollution was the most concentrated near the AMD 915 acid neutralization system, located just north of the AMD 915 facility. Soil with up to 280,000 ppb of TCE were detected below the westernmost tank in the three-tank acid neutralization system. Concentrations as great as 330,000 ppb of TCB have been detected in soil borings.

   Additional excavation and removal of tanks was carried out at the Pad 4 area near the AMD 915 building. No additional soil polluted with volatile organic chemicals (VOC's) was detected in this area or during the removal actions.

7. Groundwater Quality TCE has been used as an indicator for groundwater pollution at AMD 915. Highest, initial levels of groundwater pollution at this site were as high as 10 ppm of TCE with total VOC's as high as 100 ppm, prior to the point source removal in 1984. The highest current levels of groundwater pollution are about 1 ppm TCE for the onsite area.

8. Interim Remedial Actions, Soil Initial interim remedial actions began in 1981 with the removal of the acid neutralization system from the area north of the AMD 915 facility. The acid neutralization system and approximately 5500 cubic yards of soil were removed between December 21, 1981 and January 4, 1982. These materials were disposed of at an offsite commercial disposal facility.

   Additional removal actions were completed for a waste solvent tank and Burmar vault in the Pad 4 area in 1983 and 1984. No soil polluted with VOC's was detected in the Pad 4 area.

9. Interim Remedial Actions, Groundwater Remediation of the groundwater began with extraction of groundwater from four building dewatering sumps which were inplace from the completion of the 915 building. These sumps only extract water from the shallowest or A aquifer and three of the sumps are still operating at present. In 1982 five groundwater extraction wells were installed, with four wells extracting water from the A and B1 aquifers and one well extracting water from the A, B1 and B2 aquifers. In 1984 four additional wells

were completed with the intent to contain the polluted groundwater by intercepting flow downgradient to the north. These wells were combined with two best producing wells that had been installed in 1982 for total of six extraction wells. The extracted groundwater is piped to a groundwater treatment system, consisting of an airstripping tower and activated carbon filtration units, which was completed in January of 1984. An additional well in the B2 aquifer was added in 1985 and an eighth well was added in 1988.

All extracted groundwater is treated at the AMD 915 facility with approximately 80% reused as industrial process or cooling water, prior to release to the sanitary sewer. The remaining treated water is discharged to a storm sewer tributary of Calabazas Creek under NPDES Permit Number CA0028797.

10. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986. The Basin Plan contains water quality objectives and beneficial uses for South San Francisco Bay and contiguous surface and ground waters.

11. The existing and potential beneficial uses of the groundwater underlying and adjacent to the facility include:

    a. Industrial process water supply
    b. Industrial service water supply
    c. Municipal and Domestic water supply
    d. Agricultural water supply

12. The discharger has caused or permitted, and threatens to cause or permit waste to be discharged or deposited where it is or probably will be discharged to waters of the State and creates or threatens to create a condition of pollution or nuisance.

13. This action is an order to enforce the laws and regulations administered by the Board. This action is categorically exempt from the provisions of the CEQA pursuant to Section 15321 of the Resources Agency Guidelines.

14. Onsite and offsite interim containment and cleanup measures need to be continued to alleviate the threat to the environment posed by the continued migration of pollutants and to provide a substantive technical basis for designing and evaluating the effectiveness of final cleanup alternatives.

15. The Board has notified the discharger and interested agencies and persons of its intent under California Water Code Section 13304 to prescribe Site Cleanup Requirements for the discharge and has provided them with the opportunity for a public hearing and an opportunity to submit their written views and

recommendations.

16. The Board, in a public meeting on May 17, 1989, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the discharger shall cleanup and abate the effects described in the above findings as follows:

A. **PROHIBITIONS**

1. The discharge of wastes or hazardous materials in a manner which will degrade water quality or adversely affect the beneficial uses of the waters of the State is prohibited.

2. Further significant migration of pollutants through subsurface transport to waters of the State is prohibited.

3. Activities associated with the subsurface investigation and cleanup which will cause significant adverse migration of pollutants are prohibited.

B. **SPECIFICATIONS**

1. The storage, handling, treatment or disposal of soil or groundwater containing pollutants shall not create a nuisance as defined in Section 13050(m) of the California Water Code.

2. The discharger shall conduct monitoring activities as outlined in the amended sampling plan, approved by the Executive Officer, to define the current local hydrogeologic conditions, and the lateral and vertical extent of soil and groundwater pollution. Should monitoring results show evidence of pollutant migration, additional characterization of pollutant extent may be required.

C. **PROVISIONS**

1. The discharger shall submit to the Board acceptable monitoring program reports containing results of work performed according to a program as described in the sampling plan, as amended, and approved by the Executive Officer.

2. The discharger shall comply with Prohibitions A.1., A.2., and A.3., and Specifications B.1. and B.2. above, in accordance with the following time schedule and tasks:

COMPLETION DATE/TASK

a) COMPLETION DATE: JUNE 1, 1989

TASK: FINAL RI/FS WORKPLAN: Submit a final draft of the RI/FS workplan acceptable to the Executive Officer. This workplan shall be completed under CERCLA/SARA Guidance, and final revisions, if necessary, will be completed by the discharger and the workplan will be approved by the Executive Officer within thirty (30) days of receipt.

b) COMPLETION DATE: June 15, 1989

TASK: AMENDED SAMPLING PLAN: Submit an addendum to the Sampling Plan to include an initial sampling of selected wells for analysis by EPA method 8240 (open scan), aresenic, and chromium and inclusion of future groundwater sampling events with analysis by appropriate EPA 8000-series methods.

c) COMPLETION DATE: July 3, 1989

TASK: ADMINISTRATIVE RECORD: Submit a proposal acceptable to the Executive Officer to compile and index an Administrative Record as outlined in EPA Interim Draft Guidance on Administrative Records for Selection Of CERCLA Response Actions.

d) COMPLETION DATE: July 19, 1989

TASK: BASELINE PUBLIC HEALTH EVALUATION WORKPLAN:

Submit a technical report acceptable to the Executive Officer containing a workplan for the completion of a baseline public health evaluation prepared in accordance with the Superfund Public Health Evaluation Manual (EPA 540/1-86/060, October 1986).

e) COMPLETION DATE: January 19, 1990

TASK: BASELINE PUBLIC HEALTH EVALUATION

Submit a technical report acceptable to the Executive Officer containing a baseline public health evaluation prepared in accordance with the Superfund Public Health Evaluation Manual (EPA 540/1-86/060, October 1986).

f) COMPLETION DATE: March 16, 1990

TASK: REMEDIAL INVESTIGATION, FEASIBILITY STUDY AND REMEDIAL ACTION PLAN: Submit a technical report acceptable to the Executive Officer pursuant to the work plan described in Provision C2a), containing the results of the remedial investigation including complete site characterization, an evaluation of the installed interim remedial measures, the results of the a feasibility study evaluating alternative final remedial measures. In addition, submit a Remedial Action Plan, as a separate technical report containing 1) recommended measures necessary to achieve final cleanup objectives; and 2) the time schedule necessary to implement the recommended final remedial measure(s).

3. All Technical reports submitted must be acceptable to the Executive Officer. The submittal of technical reports evaluating interim and final remedial measures shall include a projection of the cost, effectiveness, benefits, and impact on public health and the environment.

4. The remedial investigation and feasibility study shall consider the guidance provided by Subpart F of the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300); Section 25356.1 (c) of the California Health and Safety Code; CERCLA guidance documents with reference to Remedial Investigation, Feasibility Studies, and Removal Actions; and the State Water Resources Control Board's Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California".

5. If the discharger is delayed, interrupted or prevented from meeting one or more of the completion dates specified in this Order, the discharger shall notify the Executive Officer prior to the deadline for the completion date.

6. Technical reports summarizing the status of compliance with the Prohibitions, Specifications, and Provisions of this Order and progress toward completion of tasks as identified in the workplan as revised, shall be submitted on a quarterly basis, according to the schedule below, commencing with the report for the second quarter 1989, due July 31, 1989.

Quarter	1st quarter	2nd Quarter	3rd Quarter	4th Quarter
Period	Jan-March	April-June	July-Sept	Oct-Dec
Due Date	April 30	July 31	October 31	January 31

The quarterly reports shall include;

a. a summary of work completed since the previous quarterly report,
b. appropriately scaled and labeled maps showing the location of all monitoring wells, extraction wells, and existing structures,
c. updated water table and piezometric surface maps for all affected water bearing zones, and isoconcentration maps for key pollutants in all affected water bearing zones,
d. a summary tabulation of all well construction data, groundwater levels and chemical analysis results for site monitor wells as specified in the revised sampling plan,
e. a summary tabulation of volume of extracted groundwater and results of chemical analysis for all site groundwater extraction wells,
f. identification of potential problems which will cause or threaten to cause noncompliance with this Order and what actions are being taken or planned to prevent these obstacles from resulting in noncompliance with this Order, and
g. in the event of noncompliance with the Provisions and Specifications of this Order, the report shall include written justification for noncompliance and proposed actions to achieve compliance.

7. All hydrogeological plans, specifications, reports, and documents shall be signed by or stamped with the seal of a registered geologist, engineering geologist or professional engineer.

8. All samples shall be analyzed by State certified laboratories or laboratories accepted by the Board using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain Quality Assurance/Quality Control records for Board review.

9. The discharger shall maintain in good working order, and operate, as efficiently as possible, any facility or control system installed to achieve compliance with the requirements of this Order.

10. Copies of all correspondence, reports, and documents pertaining to compliance with this Order, shall be provided to the following agencies:

    a. Santa Clara Valley Water District
    b. Santa Clara County Health Department
    c. City of Sunnyvale
    d. State Department of Health Services/TSCD
    e. U. S. EPA Region IX
    f. U.S. EPA Region IX contractor, as designated by Region IX personnel

    The Executive Officer may additionally require copies of correspondence, reports and documents pertaining to compliance with the Prohibitions, Specifications, and Provisions of this Order to be provided to a local repository for public use.

11. The discharger shall permit the Board or its authorized representative, in accordance with Section 13267(c) of the California Water Code:

    a. Entry upon premises in which any pollution sources exist, or may potentially exist, or in which any required records are kept, which are relevant to this Order.

    b. Access to copy any records required to be kept under the terms and conditions of this Order.

    c. Inspection of any monitoring equipment or methodology implemented in response to this Order.

    d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the discharger.

12. The discharger shall file a report on any changes in site occupancy and ownership associated with the facility described in this Order.

13. If any hazardous substance is discharged to any waters of the state, or discharged and deposited where it is, or probably will be discharged to any waters of the state, the discharger shall report such discharge to this Regional Board, at (415) 464-1255 on weekdays during office hours from 8 a.m. to 5 p.m., and to the Office of Emergency Services at (800) 852-7550 during non-business hours. A written report shall be filed with the Regional Board within five (5) working days and shall contain

information relative to: the nature of waste or pollutant, quantity involved, duration of incident, cause of spill, Spill Prevention, Control, and Countermeasure Plan (SPCC) in effect, if any, estimated size of affected area, nature of effect, corrective measures that have been taken or planned, and a schedule of these activities, and persons/agencies notified.

14. The Board will review this Order periodically and may revise the requirements when necessary.

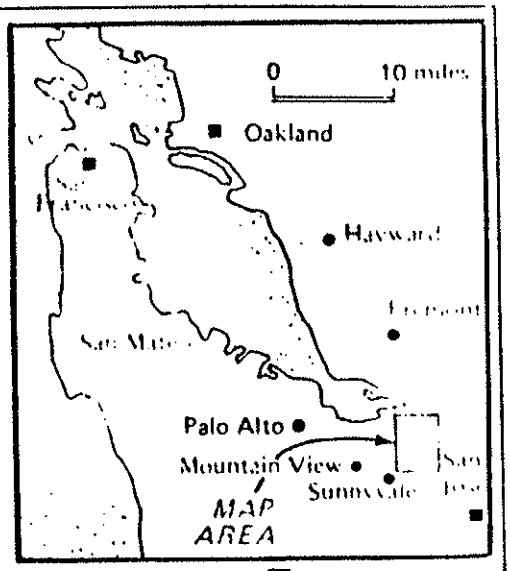
I, Steven R. Ritchie Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on May 17, 1989.

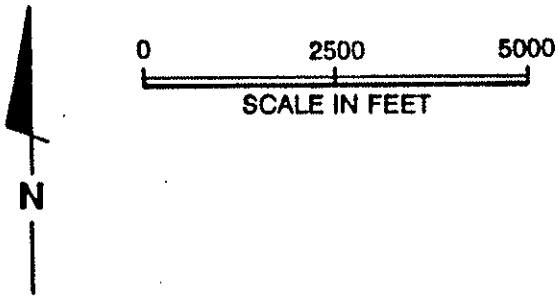
for

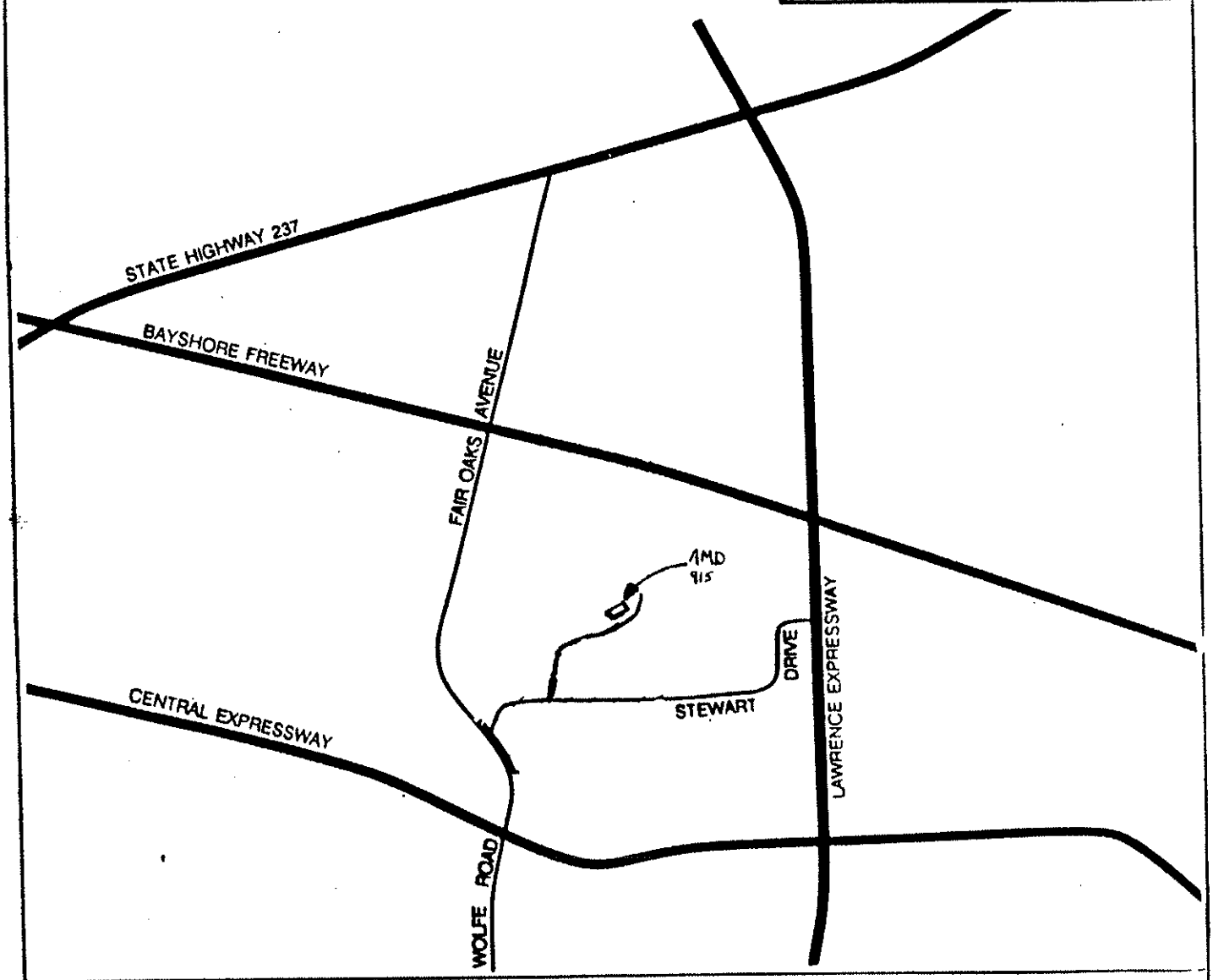
Steven R. Ritchie
Executive Officer

Attachments: Site location map

105648





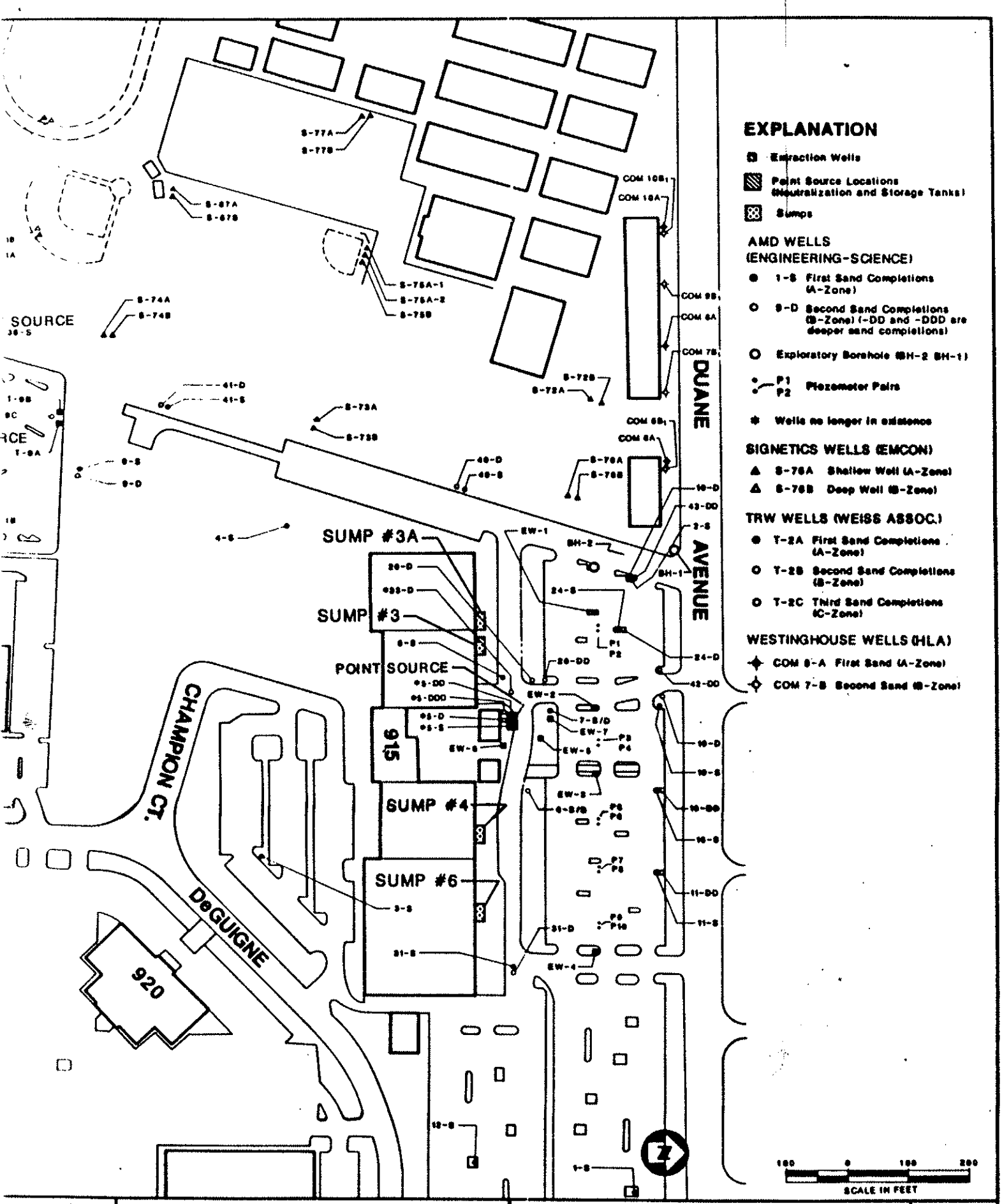


Harding Lawson Associates
Engineers and Geoscientists

Location Map
RI/FS Work Plan
The Companies
Sunnyvale, California

A1.1-1

DRAWN	JOB NUMBER	APPROVED	
AM	17279,086.02	SMF	6/88



ADVANCED MICRO DEVICES
Sunnyvale, California

PROJECT SITE

FIG. 1.2